International Scoping Study
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fact Muon Collaboration

Performance as a function of proton σ_z

Figure of merit: Number of muons within the acceptances, transverse $A_T = 30$ mm rad and longitudinal $A_L = 150$ mm per incident proton on target.

We have examined the dependence, with the proton bunch length, of the figure of merit for the U.S. design.

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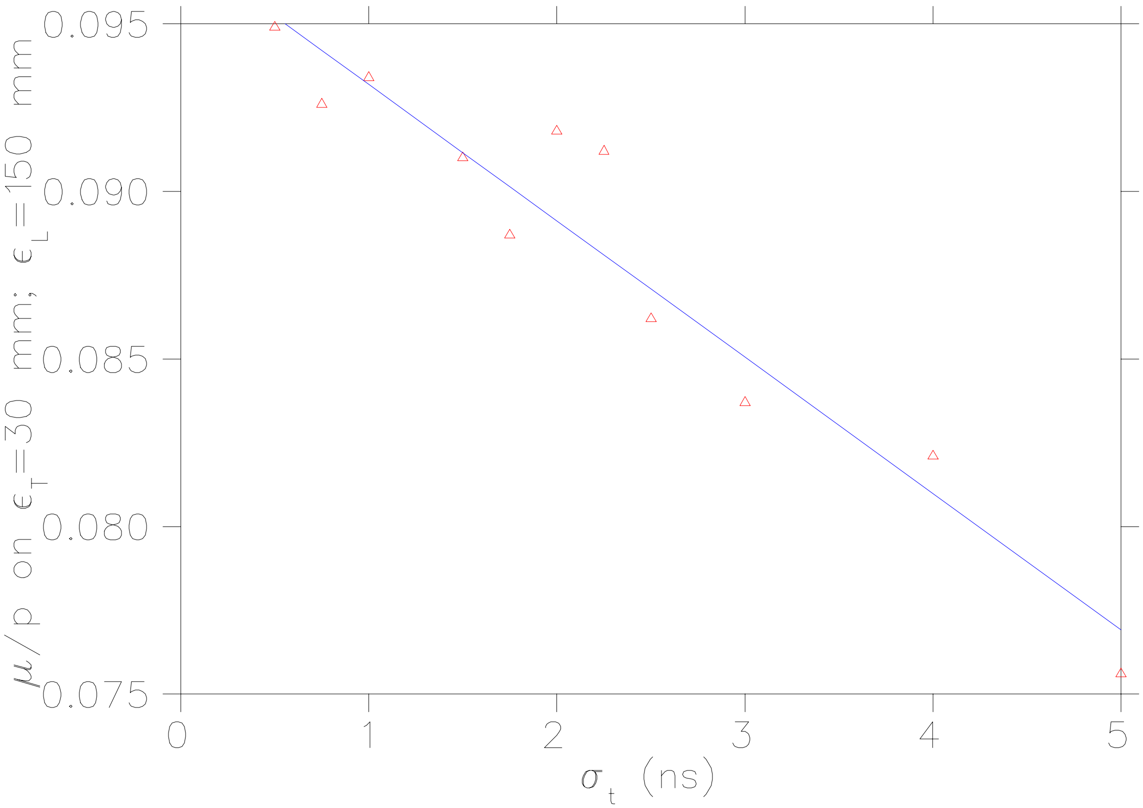
Performance as a function of proton σ_z

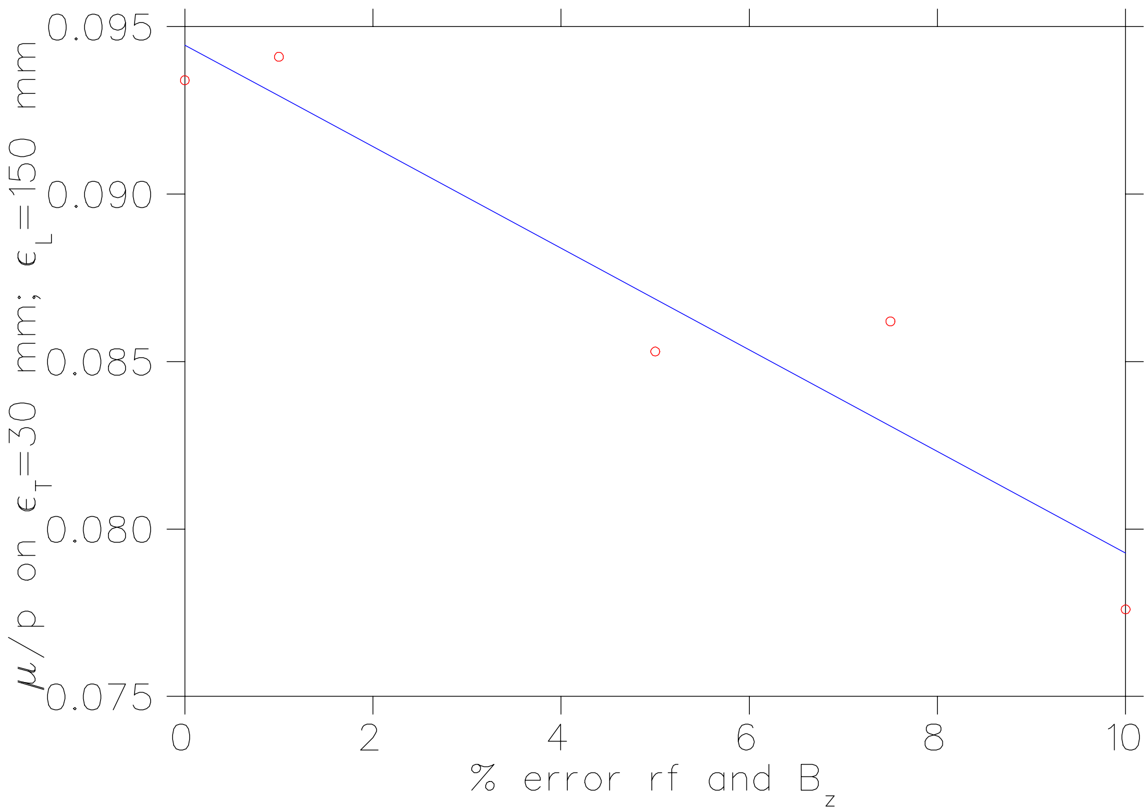


Performance with magnet and rf errors

First attempt to evaluate the dependence of the U.S. front-end performance to random magnet power supply errors as well as rf.

magnet power suppply and rf errors

The magnet lattice was broken into 10 sections. The magnets in each section were given the same error. All rf cavities were shifted by the same amount from their nominal values.



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magnet random errors

The magnet lattice was broken into 0.75 m sections. The magnets in each section were given random displacement and misalignment.

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magnet random errors

σ %	μ_A/π	μ_A/p
0	0.098	0.093
0.1	0.094	0.089
0.2	0.092	0.088
0.4	0.092	0.088
0.6	0.089	0.084
1	0.071	0.067
2	0.034	0.033
3	0.015	0.015

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Performance with reduced gradient

Changing the gradient of rf cavity from 15.25 to 10.25 MV/m, the performance is reduced by $\approx 20\%$.

It is expected that rf cavities will be produced with a range of E_{MAX}. Question is it possible to located the best cavity in particular part of the channel and maintain the performance? In the study 15.25 MV/m cavity were used in the front of the cooling section and the rest are 12.25 MV/m cavities.

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Performance with reduced gradient

High E	Low E	μ_A/π	μ_A/p
64	65	0.094	0.089
32	97	0.092	0.087
16	113	0.093	0.088
12	117	0.096	0.09
8	121	0.08	0.076